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### Ethics & Pricing in the Pharmaceutical Industry

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# ETHICS & PRICING

## IN THE PHARMACEUTICAL INDUSTRY

# TURING PHARMACEUTICALS & DARAPRIM, A W.H.O ESSENTIAL MEDICINE

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01

## TOXOPLASMOSIS

a global issue resulting from  
parasitic infection

02

## DARAPRIM

inhibits dihydrofolate reductase,  
essential for nucleic acid anabolism

03

## TURING PHARMACEUTICALS

and daraprim, a WHO essential  
medicine & its patent

04

## JUSTIFICATIONS

Other examples of price gouging,  
differences between countries.

05

## OTHER EXAMPLES

Other examples of price gouging,  
differences between countries.

# ECONOMICS AND ETHICS OF DRUG PRICING

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06

## ECONOMICS 101

How a typical business functions in capitalism vs a pharmaceutical company

07

## FINANCIAL RISK

The stages of drug development, cost of R&D, clinical trials.

08

## VALEANT PHARMACEUTICALS

Loopholes in the system, capitalism gone bad.

09

## MORAL RESPONSIBILITY

A quick dive into ethical theory and how it applies to this topic

10

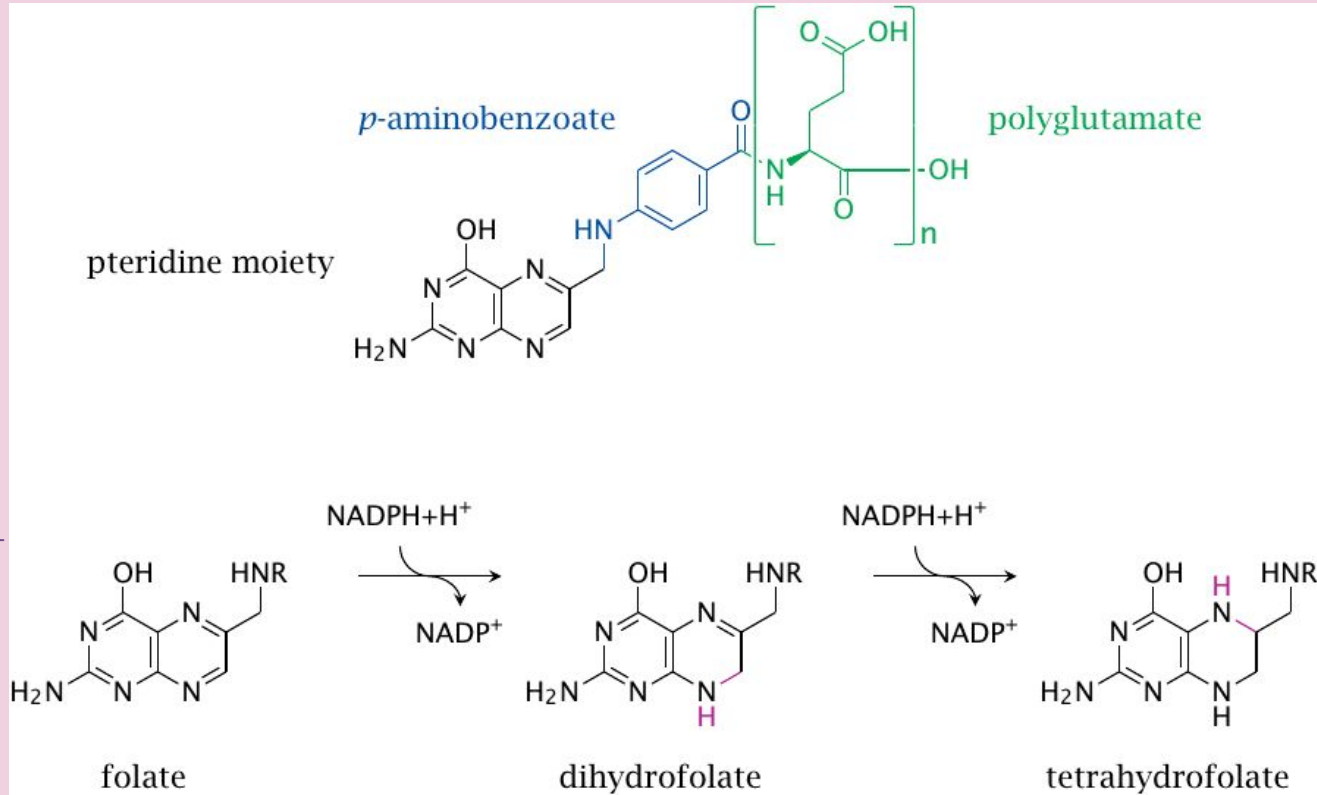
## US POLICY

Suggestions for Biden, Historical policy stances.

# TOXOPLASMOSIS



# FOLIC ACID IS REDUCED BY DHFR





# TURING PHARMACEUTICALS

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## Background

Founded Feb 24, 2015  
by Martin Shkreli.



## First Acquisitions

Retrophin, Vecamyl and  
Daraprim which had  
been approved by the  
FDA in 1953.



## The 5,455% Increase

Upon acquisition,  
Turing increased the  
price of Daraprim from  
\$13.50 a pill to \$750

# JUSTIFICATIONS

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01

Profit would be allocated to research and development of toxoplasmosis treatment

02

Daraprim is underpriced relative to its "life-saving" peers.





## MORE EXAMPLES OF PRICE GOUGING IN THE INDUSTRY

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1996: \$21  
2020: \$275

**INSULIN**



2013: \$20  
2014: \$1,849

**DOXYCYCLINE**



2012: \$0.11  
2014: \$1.10

**DIGOXIN**



2007: \$50  
2020: \$600

**EPI-PEN**



# THE MEDICINE DEVELOPMENT PROCESS

## Pre-discovery

Based on their disease focus, companies' scientists work to understand the disease

## Drug discovery

Researchers select a 'target', such as a gene or protein, then select a molecule or compound, that may act on the 'target' to alter the disease

### ● 4-5 years

Average number of years taken to develop successful medicine

### ■ £436 million

Average cost to research and develop successful medicine

### ★ 5,000 - 10,000 candidates

Number of medicinal candidates tested to achieve one approved medicine

## Pre-clinical testing

Early safety and efficacy tests are undertaken in computational models, cells and animals

### ● 5.5 years

Average number of years taken to develop successful medicine

### ■ £533 million

Average cost to research and develop successful medicine

### ★ 10-20 candidates

Number of medicinal candidates tested to achieve one approved medicine

## Phase 1 clinical trial

The candidate medicine is tested in people for the first time. Studies are conducted with about 20 to 100 healthy volunteers

### ● 7.0 years

Average number of years taken to develop successful medicine

### ■ £710 million

Average cost to research and develop successful medicine

### ★ 5-10 candidates

Number of medicinal candidates tested to achieve one approved medicine

## Phase 2 clinical trial

Researchers evaluate the candidate medicine's efficacy in about 100 to 500 patients with the disease

### ● 8.5 years

Average number of years taken to develop successful medicine

### ■ £916 million

Average cost to research and develop successful medicine

### ★ 2-5 candidates

Number of medicinal candidates tested to achieve one approved medicine

## Phase 3 clinical trial

Researchers study the candidate medicine in about 1,000 to 5,000 patients to generate data about safety, efficacy and the overall benefit-risk relationship of the medicine

### ● 11.0 years

Average number of years taken to develop successful medicine

### ■ £1.1 billion

Average cost to research and develop successful medicine

### ★ 1-2 candidates

Number of medicinal candidates tested to achieve one approved medicine

## Licensing approval

Information and results from all the studies is compiled and submitted to the regulatory agencies

● **12.5 years**

Average number of years taken to develop successful medicine

■ **£1.15 billion**

Average cost to research and develop successful medicine

★ **1 medicine**

Medicines available for patients

# CAPITALISM VS. MONOPOLY

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Goal: Sell Product to Satisfy Demand

Works: Competition and Fluctuation  
in Demand



Inelastic Demand

Patents

Valeant Pharmaceuticals

# MORAL RESPONSIBILITY & BIG PHARMA



## CONSEQUENTIALIST

Theory suggests that an action is good or bad depending on its outcome

Profit is a positive outcome, but the cost of the human life is a burden that outweighs the benefits



## DEONTOLOGICAL

Theory is based on treating humanity never simply as a means to an end.

Raising drug prices for profit treats patients as a means to an end as their demand is inelastic.



# TRUMP, BIDEN & BIG PHARMA

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- Both Biden & Trump have promised to slash drug prices
- Trump: accelerating approvals for generic drugs and pressuring big pharma to lower Medicare pricing.
  - (Mylan & Teva issues)
- Biden: calling for allowing Medicare to negotiate discounted drug prices.
- Donated \$647,000 to Trump's re-election and \$2.5 million to Biden



# YOUR THOUGHTS?

